

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 November 2005 (17.11.2005)

PCT

(10) International Publication Number
WO 2005/108302 A2

- (51) International Patent Classification⁷: **C02F 1/38**
- (21) International Application Number:
PCT/US2005/007953
- (22) International Filing Date: 14 March 2005 (14.03.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/554,557 19 March 2004 (19.03.2004) US
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- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— *without international search report and to be republished upon receipt of that report*
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: MAGNETIC NANOTUBES

(57) **Abstract:** A magnetic nanotube includes bacterial magnetic nanocrystals contacted onto a nanotube which absorbs the nanocrystals. The nanocrystals are contacted on at least one surface of the nanotube. A method of fabricating a magnetic nanotube includes synthesizing the bacterial magnetic nanocrystals, which have an outer layer of proteins. A nanotube provided is capable of absorbing the nanocrystals and contacting the nanotube with the nanocrystals. The nanotube is preferably a peptide bolaamphiphile. A nanotube solution and a nanocrystal solution including a buffer and a concentration of nanocrystals are mixed. The concentration of nanocrystals is optimized, resulting in a nanocrystal to nanotube ratio for which bacterial magnetic nanocrystals are immobilized on at least one surface of the nanotubes. The ratio controls whether the nanocrystals bind only to the interior or to the exterior surfaces of the nanotubes. Uses include cell manipulation and separation, biological assay, enzyme recovery, and biosensors.



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